

# PATENT ABSTRACTS OF JAPAN

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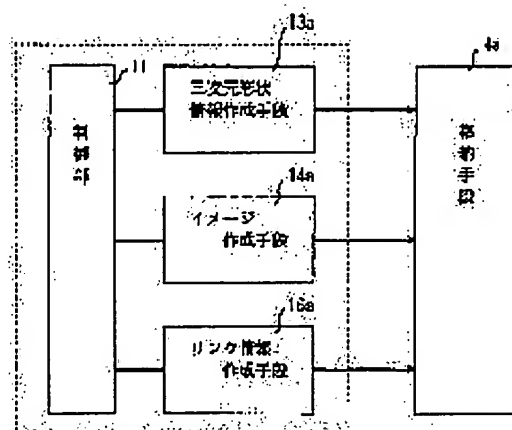
(72)Inventor : SAKAI AKIRA

## (54) THREE-DIMENSIONAL CAD(COMPUTER AIDED DESIGN) AND STORAGE MEDIUM

(57)Abstract:

PROBLEM TO BE SOLVED: To reduce quantity of data to which access is made by properly using image information viewed from a fixed angle and information to be viewed from an optional angle at a proper place.

SOLUTION: A three-dimensional shape information creating means 13a to create information by which the three-dimensional shape by every component is confirmed from assembly model information created by the three-dimensional CAD, an image creating means 14a to create an image of an assembly model and a link information creating means 16a to create information to be linked with the information by which the three-dimensional shape of the corresponding component is confirmed by every dot of the image are provided in this invention.



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CLAIMS

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[Claim(s)]

[Claim 1] The 3-dimensional CAD characterized by to have a link-information creation means create a three-dimensions configuration information creation means create the information which can check the three-dimensions configuration for every each part article from the assembly model information created by 3-dimensional CAD, an image creation means create the image of an assembly model, and the information that link to the information which can check said three-dimensions configuration of corresponding components for every dot of said image.

[Claim 2] It is the 3-dimensional CAD according to claim 1 characterized by creating the link information summarized with the polygon when the link place which said link-information creation means is each dot of said image, and adjoins each other is the same.

[Claim 3] It is the 3-dimensional CAD according to claim 1 which said link-information creation means divided said image with two or more rectangles or circles, and was characterized by making the inside of the rectangle or a circle into the same link place.

[Claim 4] Said link-information creation means is the 3-dimensional CAD according to claim 1 characterized by considering the link place currently most used within the break and this 1 break by the grid-like matrix with the number of dots which had said image specified as a representation link.

[Claim 5] The record medium which recorded the program for operating a computer as a link-information creation means create the information which links to a three-dimensions configuration information creation means create the information which can check the three-dimensions configuration for every each part article from the assembly model information created by 3-dimensional CAD, an image creation means create the image of an assembly model, and the information that can check said three-dimensions configuration of corresponding components for every dot of said image and in which computer reading is possible.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the 3-dimensional CAD (three-dimensions computer-aided design equipment) and record medium which output the data for the Internet which linked an image and VRML (virtual reality modeling language) support (a link place is shown), the data for intranets, etc.

[0002] Reference of the 3-dimensional CAD (3D-CAD) data using WWW (World Wide Web) prospers, and even if it is not 3D-CAD or the viewer of dedication, a 3-dimensional CAD model configuration is seen from arbitration. Generally these are used for the web browser (it is also only called Web) which is a program for displaying a WWW page, it being attached or carrying out plug-in.

[0003]

[Description of the Prior Art] Although the configuration where the image image was stuck was seen in order to check the configuration of 3-dimensional CAD conventionally, it could not refer to from arbitration, or could not expand and see, and the technique in which it wrote and a three-dimensions configuration could be checked by the web browser was demanded. And this technique was realized by the interface of VRML in recent years [ here ].

[0004] This is the file format standardized globally and is indispensable to shape recognition. Since the advantage using this VRML was a standard interface independent of 3D-CAD, and it ended with the simple data only for that it can watch from an arbitration include angle easily by the general web browser, and a display even if it was not the viewer which specialized in CAD, it was raised by one with the light (it compares with CAD data and they are 1/dozens) amount of data that a Web data transfer does not take time amount.

[0005]

[Problem(s) to be Solved by the Invention] The following technical problems occurred in said conventional thing.

(1): Although the amount of data became light, to the last, it was a value in comparison with CAD bulk data (raw data), and from the image data used for the former, it was markedly alike, and was a big value.

[0006] (2): Although were based also on CAD classification / product data, and it is a usual state that the 3D-CAD data for 1 model amount to hundreds of MB and it dropped to 1/dozens how much When it was going to see all 1 model, even if it tended to be set also to dozens of MB and the download time amount from Web not only turns into unreal time amount, but was going to display such big data on employment, the display program might terminate abnormally from the lack of a resource of a personal computer.

[0007] By solving such a conventional technical problem and using the image information at which it looked from whenever [ fixed angle ], and the VRML information at which it can look from an arbitration include angle by the right man in the right place, this invention can reduce the access amount of data, and aims at compaction and a VRML display of the transfer time from Web enabling it to realize easily.

[0008]

[Means for Solving the Problem] Drawing 1 is the principle explanatory view of this invention. For a storing means and 11, a control section and 13a are [ 4a / an image creation means and 16a of a three-dimensions configuration information creation means and 14a ] link-information creation means among drawing 1 .

[0009] This invention was constituted as follows in order to solve said conventional technical problem.

(1): It has the link-information creation means 16 a which creates the three-dimensions configuration information creation means 13a which creates the information which can check the three-dimensions configuration for every each part article from the assembly model information created by 3-dimensional CAD, the image creation means 14a which creates the image of an assembly model, and the information which link to the information which can check said three-dimensions configuration of corresponding components for every dot of said image.

[0010] (2): In the aforementioned (1) 3-dimensional CAD, said link-information creation means 16a is each dot of said image, and when an adjacent link place is the same, create the link information summarized with the polygon.

[0011] (3): In the aforementioned (1) 3-dimensional CAD, said link-information creation means 16a divides said image with two or more rectangles or circles, and let the inside of the rectangle or a circle be the same link place.

[0012] (4): In the aforementioned (1) 3-dimensional CAD, said link-information creation means 16a considers the link place currently most used within the break and this 1 break by the grid-like matrix with the number of dots which had said image specified as a representation link.

[0013] (5): Three-dimensions configuration information creation means 13a which creates the information which can check the three-dimensions configuration for every each part article from the assembly model information created by 3-dimensional CAD, As link-information creation means 16a which creates image creation means 14a which creates the image of an assembly model, and the information linked to the information which can check said three-dimensions configuration of corresponding components for every dot of said image It considers as the record medium which recorded the program for operating a computer and in which computer reading is possible.

[0014] (Operation) The operation based on said configuration is explained. The information which can check the three-dimensions configuration for every each part article from the assembly model information created by 3-dimensional CAD by three-dimensions configuration information creation means 13a is created, the image of an assembly model is created by image creation means 14a, and the information linked to the information which can check said three-dimensions configuration of the components which correspond for every dot of said image by link-information creation means 16a is created. For this reason, the data which stuck the link on the information ( VRML of components) which can check the three dimensions configuration of the components which correspond for every dot of each image since it be the aggregate of each display dot can be create automatically, it will link to VRML of the components which correspond even if it specify which point with a mouse etc., an image and VRML be use properly, and an image data can lessen the amount of data transfer for three dimensions configuration retrieval.

[0015] Moreover, when the link place which adjoins each other by each dot of said image is the same at said link-information creation means 16a, the link information summarized with the polygon is created. For this reason, link data are generated in polygon approximation and link data can be reduced (cutback).

[0016] Furthermore, by said link-information creation means 16a, said image is divided with two or more rectangles or circles, and let the inside of the rectangle or a circle be the same link place. For this reason, it can collect in the field of a rectangle or a circle, and link data can be reduced further.

[0017] Moreover, the link place currently most used within the break and this 1 break by the grid-like matrix with the number of dots which had said image specified is considered as a representation link by said link-information creation means 16a. For this reason, it can collect by the break of a matrix and link data can be reduced more.

[0018] Furthermore, three-dimensions configuration information creation means 13a which creates the information which can check the three-dimensions configuration for every each part article from the assembly model information created by 3-dimensional CAD, As a link-information creation means to create an image creation means to create the image of an assembly model, and the information linked to the information which can check said three-dimensions configuration of corresponding components for every dot of said image It considers as the record medium which recorded the program for operating a computer and in which computer

reading is possible. For this reason, the 3-dimensional CAD which can lessen the amount of data transfer for three-dimensions configuration retrieval can be offered by installing the program of this record medium in a computer.

[0019]

[Embodiment of the Invention] The access amount of data can be reduced and compaction and a VRML display of the transfer time from Web enable it to realize easily in this invention by using the image information at which it looked from whenever [ fixed angle ], and the VRML information at which it can look from an arbitration include angle.

[0020] By general configuration retrieval, it is (1). The overall external view of a product is displayed and it is (2). The components with which relevance is located are chosen and, usually the detail of each components is investigated. this retrieval -- (1) of the beginning from -- although time amount will be taken if VRML is used -- (1) \*\*\*\* -- an image -- using -- a detail phase -- (2) from -- it is possible to reduce the overall amount of data transfer extremely by using VRML.

[0021] (1): Explain link place assignment with the explanation HTML language of link place assignment with HTML language. Link place data are <MAP->. A sentence to </MAP> Between sentences <AREA SHAPE-> It is specified in a sentence. Hereafter, an example explains.

[0022]

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<MAP NAME="TEST"> <AREA SHAPE="rect" COORDS= -- "10, 20 30, 40" HREF=" rect.html" -- > -- **
<AREA SHAPE="rect" COORDS="50, 60 70, 80" NOHREF> ** <AREA SHAPE="Circle" COORDS="100,200,
50" HREF=" circle.html"> ** <AREA SHAPE="poly" COORDS= -- "100,100 100,200 0,150" --
HREF="poly.html"> ** </MAP> The semantics of each line of the above-mentioned ** - ** is as follows.
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[0023] \*\* A link configuration is "rect.html" when the inside of a field is clicked with the rectangle (rect) surrounded with coordinates P1 (x= 10, y= 20) and P2 (x= 30, y= 40). It displays.

[0024] \*\* No link configurations will be carried out if the inside of a field is clicked with the rectangle (rect) surrounded with coordinates P1 (x= 50, y= 60) and P2 (x= 70, y= 80) (NOHREF).

[0025] \*\* A link configuration is "circle.html" when the inside of a circle (central point (x= 100, y= 200) radius = 50) field is clicked. It displays.

\*\* A link configuration is "poly.html" when the inside of the region surrounded by the assignment point group (in this case, three points (100,100), (100,200), (0,150)) is clicked. It displays.

[0026] In addition, in image attachment, it is "image.gif" like <IMG solvent refined coal="image.gif" usemap="test">. The map linked by displaying and clicking is written like "test", and attaches MAP NAME and a response.

[0027] (2): Three-dimensions data and the explanatory view 2 of an image are explanatory views of a three dimensional object model and an image, and are the explanation whose drawing 2 (b) drawing 2 (a) looked at explanation of the relation between a three dimensional object model and an image, and looked at Field F from the transverse plane.

[0028] In drawing 2 (a), it is image drawing which was projected on the field F where the 3D-CAD models A and B intersect perpendicularly with the include angle from View VP. Thus, the thing near View VP will be displayed, an image may hide thoroughly depending on the case where they are no projection fields of each model (the field of Model A and the field of Model B change with those times), and its field of it may be lost (the field of Model C is hidden thoroughly).

[0029] In drawing 2 (b), the image display in the case of carrying out a Web output with the three-dimensions assembly model (Model A, the model (B) in this case) seen from the include angle (view VP) of arbitration is shown. However, when displaying this by VRML, loading of the VRML file of Model A and Model B must be carried out, and this requires time amount for mass data processing.

[0030] Then, the image data of whenever [ fixed angle / which was prepared beforehand ] and VRML according to each are prepared, and by display assignment of the first Web, it can see, if an image is displayed and VRML of the components (model A etc.) specified according to the individual next is displayed, and the upper processing time can be distributed. It enables it to output the data linked to VRML of applicable components to the image indicative data.

[0031] (3): The explanatory view 3 of the relation of the 3-dimensional CAD and WWW browser which output the data for Web is an explanatory view of the relation of 3-dimensional CAD and a WWW browser. In drawing 3, 3-dimensional CAD (3D-CAD) 1 is displayed on the 3D-CAD screen of dedication of the 3D-CAD data stored in the storing means 3. Moreover, 3-dimensional CAD 1 is outputted to the storing means 4 by using as Web data (data for the Internet) an image indicative data and the data linked to VRML of applicable components. A user outputs this Web data to the browser screen 6 through WWW browser 5, and can see the 3D-CAD model from arbitration.

[0032] (4): The explanatory view 4 of the 3-dimensional CAD which outputs the data for Web is an explanatory view of the 3-dimensional CAD which outputs the data for Web. In drawing 4, left-hand side [dotted line] shows the interior of 3-dimensional CAD, and right-hand side shows the exterior. A control section 11, 3D reading control section 12, the VRML output-control section 13, the image output-control section 14, the link merge application 15, the HTML creation control section 16, the assembly information reading section 17, the components information reading section 18, the VRML output section 19, the image output section 20, the information output section 21 corresponding to an article for every dot, the link table reading processing section 22, the HTML output section 23, and the response table 24 of each dot and an article are formed in the interior of 3-dimensional CAD.

[0033] Each storing means of the assembly information 25 which is 3D-CAD information, the part-shape information 26 which is 3D-CAD information, VRML27 for every each part article, the image 28 for every scene, and the HTML29 grade for every scene is formed in the exterior of 3-dimensional CAD.

[0034] (Explanation of operation) It is actuation of 3-dimensional CAD (1) - (8) It follows and explains.

(1) a control section 11 -- 3D reading control section 12 -- going -- the assembly information reading section 17 and the components information reading section 18 -- 3D-CAD information (data) it is -- the assembly information 25 and the part-shape information 26 are read.

[0035] (2) A control section 11 is the above (1). Directions are taken out to the VRML output section 19 so that the VRML output of the VRML information for every each part article may be automatically carried out in the VRML output-control section 13 based on the acquired information, and VRML27 for every each part article is outputted.

[0036] This is the 3-dimensional each configuration file found with 3D viewer in Web.

(3) Moreover, the above (2) In addition to an output, by the control section 11, directions are passed so that image information may be created in the image output-control section 14.

[0037] (4) Create the image 28 for every scene in the image output-control section 14 as a general format (bmp, tiff, gif, jpeg ...) normalized from the image output section 20 in the image information at which it looked from each.

[0038] This is a still picture file for every scene seen with the image viewer of Web.

(5) At the image output-control section 14, it is the above (4). It records what article is displayed for every dot location on each image on "the response table 24 of each dot and an article" via the information output section 21 corresponding to an article for every dot at the same time it outputs image information.

[0039] This information is similar to the data of drawing 5 mentioned later.

(6) Above (5) Simplification to drawing 6 later mentioned by the link merge application 15 based on the outputted "response table 24 of each dot and an article" - drawing 10 is performed, and "the response table 24 of each dot and an article" is updated.

[0040] (7) At a control section 11, it is the above (6). Control is passed to the HTML creation control section 16 when it completes.

(8) The HTML creation control section 16 reads the content of "the response table 24 of each dot and an article" in the link table reading processing section 22, changes it into a support data character string, and output it to "HTML29 for every scene" via the HTML output section 23.

[0041] This is the HTML file of Web.

(5): The explanatory view 5 of the example of VRML support setting out of explanation a each display dot of VRML support setting out of a display dot is an explanatory view of VRML support setting out of each display dot, drawing 5 (a) is an image description of drawing, and drawing 5 (b) is explanation of the example of data.

[0042] The image of the rectangular components A and B is shown in drawing 5 (a). For example, Components B are shown by each dot (64 72) which is each point, (65, 72), (66, 72), (67, 72), (64, 73), (65, 73), (66, 73), and (67, 73).

[0043] In drawing 5 (b), it is data which stuck the link on VRML of the components corresponding to each display dot (each point) of every [ of the rectangular components A and B (image) ]. This is automatically created by the HTML creation control section 16 of 3-dimensional CAD. For example, in the example of data of a drawing upper case, if a dot (64 72) is clicked, it will direct to carry out loading of the VRML of Components B.

[0044] b) The explanatory view 6 of the example which summarized each dot and reduced link place data is an explanatory view of VRML support setting out in which each display dot was summarized, drawing 5 (a) is an image description of drawing, and drawing 6 (b) is explanation of the example of data.

[0045] The image of the rectangular components A and B is shown in drawing 6 (a). This is the same as drawing 5 (a). In drawing 6 (b), by the method explained by drawing 5, it must specify for every display dot and link data become huge. Then, a link place is summarized when an adjacent link place is the same. For example, in the example of data of a drawing upper case, if the inside of a field is clicked with the rectangle (rect) surrounded by the dot (64 72) and the dot (67 73), it is directing to carry out loading of the VRML of Components B.

[0046] c) explanation of how in a polygon to collect -- in a actual example, it does not become a rectangle like the example of drawing 6 For this reason, it will divide into a polygon and a link place will be summarized.

[0047] Drawing 7 is an explanatory view (the 1) of a way in a polygon to pack, drawing 7 (a) is an image description of drawing, and drawing 7 (b) is explanation of the polygonal example of division (1). Drawing 8 is an explanatory view (the 2) of a way in a polygon to pack, drawing 8 (a) is explanation of the polygonal example of division (2), and drawing 8 (b) is explanation of the polygonal example of division (3). Drawing 9 is an explanatory view (the 3) of a way in a polygon to pack, drawing 9 (a) is an image description of drawing, and drawing 9 (b) is explanation of the polygonal example of division (4).

[0048] In drawing 7 (a), it is the image of the polygonal components A and B, and Components B are shown by the slash and Components A are shown by the grid.

- In the explanatory view 7 in the case of dividing each part article A and B into a polygon, and summarizing a link place (b), each part article A and B is divided into a polygon for an image data, and the link place is summarized. For example, with Components B, since Components A are in inside, it has divided into four polygons.

[0049] - Create link data so that data may be further lessened in the explanatory view 8 in the case of considering the link place currently used most as a representation link (a) in the field in every several dots, and it may become a representation link about the link place currently most used not in each dot but in the field in every several dots. For example, the dot of the small (2 dots) components A surrounded by the components B of drawing 7 (b) reduces link data as components B (Components A are deleted) like drawing 8 (a).

[0050] - By collecting in fields, such as a rectangle and a circle, in the explanatory view 8 in the case of making link format simple (b), all image datas are approximated with a rectangle, it can simplify and link data can be reduced. In addition, it is also possible to be also able to collect not with a rectangle but with a circle, and to collect using a rectangle and a circle.

[0051] - In the explanatory view 9 in the case of making it link to the components currently most used within the break and the matrix by the grid-like matrix with the number of dots specified beforehand (a), the image of the polygonal components A and B is the same as drawing 7 (a), and being divided by the matrix of the shape of a grid of a 9-dot number is shown.

[0052] In drawing 9 (b), link data are created so that it may be made to link to components with the field currently most used within a break and this matrix by the matrix of the shape of a grid of a 9-dot number in the image data of drawing 9 (a). Thereby, in Components A, two pieces and Components B serve as a break of ten matrices.

[0053] (6): The explanatory view 10 of a 3D-CAD screen is an explanatory view of a 3D-CAD screen. In



drawing 10 , the example of menu placement into 3-dimensional CAD is shown in the 3D-CAD screen. Each part article is displayed on left-hand side, and the directions section of an input, an output, CAD, the exterior, IGES (foreign file), and DXF (foreign file) and WWW is prepared in right-hand side.

[0054] (7): The explanatory view 11 of the example of a link is an explanatory view of the example of a link. In drawing 11 , the image is shown in the upper left. The rectangle frames A, B, C, D, E, and F are formed in this image. By clicking these rectangle frames A, B, C, D, and E and the interior of F, loading of the VRML of corresponding components is carried out, and a VRML screen is displayed.

[0055] For example, if the inside of the rectangle frame A is clicked, the VRML screen (A) shown by the arrow head will be displayed. If the inside of the rectangle frame B is clicked, the VRML screen (B) shown by the arrow head will be displayed. In addition, a click of outside the limit [ of the rectangle frames A, B, C, D, E, and F ] will display the whole VRML screen (H).

[0056] In addition, although the link to Components VRML explained from the image on account of explanation with the gestalt of said operation, with a large-scale real product, from a product assembly condition, it is further decomposed with the child unit, and a unit and after passing through some tree structures, components are reached in many cases. For this reason, it is desirable to make it link to a unit image from product image information actually, and to link to VRML of components from a terminal-unit image.

[0057] Moreover, if the image information in each stage creates automatically the image information seen from some directions and display selection is enabled at the time of retrieval, it is more practical.

[0058] As mentioned above, in the three-dimensions configuration retrieval system using the Internet, since the amount of data transfer decreases, it becomes possible to make improvement in the speed and the network load of a response mitigate.

[0059] (8): Explanation three-dimensions configuration information creation means 13a of install of a program, Image creation means 14a, link-information creation means 16a, 3D reading control section 12, the VRML output-control section 13, the image output-control section 14, the link merge application 15, the HTML creation control section 16, the assembly information reading section 17, the components information reading section 18, the VRML output section 19, the image output section 20, the information output section 21 corresponding to an article for every dot, The link table reading processing section 22 and HTML output section 23 grade can be constituted from a program, and the main control section (CPU) performs them, and they are stored in the primary storage. These programs are processed with data processors (computer), such as a common personal computer, a common workstation, etc. This computer consists of hardware, such as an input unit which are input means, such as file equipments, such as the main control section, a primary storage, and a hard disk, an indicating equipment, and a keyboard.

[0060] The program of this invention is installed in this computer. This install stores these programs in the record (storage) medium of portable molds, such as a floppy and a magneto-optic disk, and is installed in the file equipment formed in the computer through networks, such as LAN, through the drive equipment for accessing to the record medium with which the computer is equipped. And a program step required for processing is read from this file equipment to a primary storage, and the main control section performs.

[0061]

[Effect of the Invention] As explained above, according to this invention, there is the following effectiveness.

(1): Create the information which can check the three-dimensions configuration for every each part article from the assembly model information created by 3-dimensional CAD with the three-dimensions configuration information creation means. In order to create the image of an assembly model with an image creation means and to create the information linked to the information which can check said three-dimensions configuration of the components which correspond for every dot of said image with a link-information creation means, An image and the information (VRML) which can check a three-dimensions configuration are used properly, and the amount of data transfer for three-dimensions configuration retrieval can be lessened.

[0062] (2): With a link-information creation means, since the link information summarized with the polygon is created when an adjacent link place is the same at each dot of an image, link data are generated in polygon approximation and link data can be reduced (cutback).

[0063] (3): With a link-information creation means, an image is divided with two or more rectangles or circles,

and since the inside of the rectangle or a circle is made into the same link place, it can be summarized in the field of a rectangle or a circle, and can reduce link data further.

[0064] (4): With a link-information creation means, since the link place currently most used within the break and this 1 break by the grid-like matrix with the number of dots which had the image specified is considered as a representation link, it can collect by the break of a matrix and link data can be reduced more.

[0065] (5): A three-dimensions configuration information creation means to create the information which can check the three-dimensions configuration for every each part article from the assembly model information created by 3-dimensional CAD, As a link-information creation means to create an image creation means to create the image of an assembly model, and the information linked to the information which can check said three-dimensions configuration of corresponding components for every dot of said image In order to consider as the record medium which recorded the program for operating a computer and in which computer reading is possible, the program of this record medium by installing in a computer The 3-dimensional CAD which can lessen the amount of data transfer for three-dimensions configuration retrieval can be offered.

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TECHNICAL FIELD

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[Field of the Invention] This invention relates to the 3-dimensional CAD (three-dimensions computer-aided design equipment) and record medium which output the data for the Internet which linked an image and VRML (virtual reality modeling language) support (a link place is shown), the data for intranets, etc.

[0002] Reference of the 3-dimensional CAD (3D-CAD) data using WWW (World Wide Web) prospers, and even if it is not 3D-CAD or the viewer of dedication, a 3-dimensional CAD model configuration is seen from arbitration. Generally these are used for the web browser (it is also only called Web) which is a program for displaying a WWW page, it being attached or carrying out plug-in.

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PRIOR ART

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[0004] This is the file format standardized globally and is indispensable to shape recognition. Since the advantage using this VRML was a standard interface independent of 3D-CAD, and it ended with the simple data only for that it can watch from an arbitration include angle easily by the general web browser, and a display even if it was not the viewer which specialized in CAD, it was raised by one with the light (it compares with CAD data and they are 1/dozens) amount of data that a Web data transfer does not take time amount.

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EFFECT OF THE INVENTION

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[Effect of the Invention] As explained above, according to this invention, there is the following effectiveness.

[0061] (1): Create the information which can check the three-dimensions configuration for every each part article from the assembly model information created by 3-dimensional CAD with the three-dimensions configuration information creation means. In order to create the image of an assembly model with an image creation means and to create the information linked to the information which can check said three-dimensions configuration of the components which correspond for every dot of said image with a link-information creation means, An image and the information (VRML) which can check a three-dimensions configuration are used properly, and the amount of data transfer for three-dimensions configuration retrieval can be lessened.

[0062] (2): With a link-information creation means, since the link information summarized with the polygon is created when an adjacent link place is the same at each dot of an image, link data are generated in polygon approximation and link data can be reduced (cutback).

[0063] (3): With a link-information creation means, an image is divided with two or more rectangles or circles, and since the inside of the rectangle or a circle is made into the same link place, it can be summarized in the field of a rectangle or a circle, and can reduce link data further.

[0064] (4): With a link-information creation means, since the link place currently most used within the break and this 1 break by the grid-like matrix with the number of dots which had the image specified is considered as a representation link, it can collect by the break of a matrix and link data can be reduced more.

[0065] (5): A three-dimensions configuration information creation means to create the information which can check the three-dimensions configuration for every each part article from the assembly model information created by 3-dimensional CAD, As a link-information creation means to create an image creation means to create the image of an assembly model, and the information linked to the information which can check said three-dimensions configuration of corresponding components for every dot of said image In order to consider as the record medium which recorded the program for operating a computer and in which computer reading is possible, the program of this record medium by installing in a computer The 3-dimensional CAD which can lessen the amount of data transfer for three-dimensions configuration retrieval can be offered.

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TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] The following technical problems occurred in said conventional thing.

(1): Although the amount of data became light, to the last, it was a value in comparison with CAD bulk data (raw data), and from the image data used for the former, it was markedly alike, and was a big value.

[0006] (2): Although were based also on CAD classification / product data, and it is a usual state that the 3D-CAD data for 1 model amount to hundreds of MB and it dropped to 1/dozens how much When it was going to see all 1 model, even if it tended to be set also to dozens of MB and the download time amount from Web not only turns into unreal time amount, but was going to display such big data on employment, the display program might terminate abnormally from the lack of a resource of a personal computer.

[0007] By solving such a conventional technical problem and using the image information at which it looked from whenever [ fixed angle ], and the VRML information at which it can look from an arbitration include angle by the right man in the right place, this invention can reduce the access amount of data, and aims at compaction and a VRML display of the transfer time from Web enabling it to realize easily.

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MEANS

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[Means for Solving the Problem] Drawing 1 is the principle explanatory view of this invention. For a storing means and 11, a control section and 13a are [ 4a / an image creation means and 16a of a three-dimensions configuration information creation means and 14a ] link-information creation means among drawing 1 .

[0009] This invention was constituted as follows in order to solve said conventional technical problem.

(1): It has the link-information creation means 16 a which creates the three-dimensions configuration information creation means 13a which creates the information which can check the three-dimensions configuration for every each part article from the assembly model information created by 3-dimensional CAD, the image creation means 14a which creates the image of an assembly model, and the information which link to the information which can check said three-dimensions configuration of corresponding components for every dot of said image.

[0010] (2): In the aforementioned (1) 3-dimensional CAD, said link-information creation means 16a is each dot of said image, and when an adjacent link place is the same, create the link information summarized with the polygon.

[0011] (3): In the aforementioned (1) 3-dimensional CAD, said link-information creation means 16a divides said image with two or more rectangles or circles, and let the inside of the rectangle or a circle be the same link place.

[0012] (4): In the aforementioned (1) 3-dimensional CAD, said link-information creation means 16a considers the link place currently most used within the break and this 1 break by the grid-like matrix with the number of dots which had said image specified as a representation link.

[0013] (5): Three-dimensions configuration information creation means 13a which creates the information which can check the three-dimensions configuration for every each part article from the assembly model information created by 3-dimensional CAD, As link-information creation means 16a which creates image creation means 14a which creates the image of an assembly model, and the information linked to the information which can check said three-dimensions configuration of corresponding components for every dot of said image It considers as the record medium which recorded the program for operating a computer and in which computer reading is possible.

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## OPERATION

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(Operation) The operation based on said configuration is explained. The information which can check the three-dimensions configuration for every each part article from the assembly model information created by 3-dimensional CAD by three-dimensions configuration information creation means 13a is created, the image of an assembly model is created by image creation means 14a, and the information linked to the information which can check said three-dimensions configuration of the components which correspond for every dot of said image by link-information creation means 16a is created. For this reason, the data which stuck the link on the information ( VRML of components) which can check the three dimensions configuration of the components which correspond for every dot of each image since it be the aggregate of each display dot can be create automatically, it will link to VRML of the components which correspond even if it specify which point with a mouse etc., an image and VRML be use properly, and an image data can lessen the amount of data transfer for three dimensions configuration retrieval.

[0015] Moreover, when the link place which adjoins each other by each dot of said image is the same at said link-information creation means 16a, the link information summarized with the polygon is created. For this reason, link data are generated in polygon approximation and link data can be reduced (cutback).

[0016] Furthermore, by said link-information creation means 16a, said image is divided with two or more rectangles or circles, and let the inside of the rectangle or a circle be the same link place. For this reason, it can collect in the field of a rectangle or a circle, and link data can be reduced further.

[0017] Moreover, the link place currently most used within the break and this 1 break by the grid-like matrix with the number of dots which had said image specified is considered as a representation link by said link-information creation means 16a. For this reason, it can collect by the break of a matrix and link data can be reduced more.

[0018] Furthermore, three-dimensions configuration information creation means 13a which creates the information which can check the three-dimensions configuration for every each part article from the assembly model information created by 3-dimensional CAD, As a link-information creation means to create an image creation means to create the image of an assembly model, and the information linked to the information which can check said three-dimensions configuration of corresponding components for every dot of said image It considers as the record medium which recorded the program for operating a computer and in which computer reading is possible. For this reason, the 3-dimensional CAD which can lessen the amount of data transfer for three-dimensions configuration retrieval can be offered by installing the program of this record medium in a computer.

[0019]

[Embodiment of the Invention] The access amount of data can be reduced and compaction and a VRML display of the transfer time from Web enable it to realize easily in this invention by using the image information at which it looked from whenever [ fixed angle ], and the VRML information at which it can look from an arbitration include angle.

[0020] By general configuration retrieval, it is (1). The overall external view of a product is displayed and it is (2). The components with which relevance is located are chosen and, usually the detail of each components is investigated. this retrieval -- (1) of the beginning from -- although time amount will be taken if VRML is used



-- (1) \*\*\*\* -- an image -- using -- a detail phase -- (2) from -- it is possible to reduce the overall amount of data transfer extremely by using VRML.

[0021] (1): Explain link place assignment with the explanation HTML language of link place assignment with HTML language. Link place data are <MAP->. A sentence to </MAP> Between sentences <AREA SHAPE-> It is specified in a sentence. Hereafter, an example explains.

[0022]

```
<MAP NAME="TEST"> <AREA SHAPE="rect" COORDS= -- "10, 20 30, 40" HREF=" rect.html" -- > -- **
<AREA SHAPE="rect" COORDS="50, 60 70, 80" NOHREF> ** <AREA SHAPE="Circle" COORDS="100,200
50" HREF=" circle.html"> ** <AREA SHAPE="poly" COORDS= -- "100,100 100,200 0,150" --
HREF="poly.html"> ** </MAP>
```

The semantics of each line of the above-mentioned \*\* - \*\* is as follows.

[0023] \*\* A link configuration is "rect.html" when the inside of a field is clicked with the rectangle (rect) surrounded with coordinates P1 (x= 10, y= 20) and P2 (x= 30, y= 40). It displays.

[0024] \*\* No link configurations will be carried out if the inside of a field is clicked with the rectangle (rect) surrounded with coordinates P1 (x= 50, y= 60) and P2 (x= 70, y= 80) (NOHREF).

[0025] \*\* A link configuration is "circle.html" when the inside of a circle (central point (x= 100, y= 200) radius = 50) field is clicked. It displays.

\*\* A link configuration is "poly.html" when the inside of the region surrounded by the assignment point group (in this case, three points (100,100), (100,200), (0,150)) is clicked. It displays.

[0026] In addition, in image attachment, it is "image.gif" like <IMG solvent refined coal="image.gif" usemap="test">. The map linked by displaying and clicking is written like "test", and attaches MAP NAME and a response.

[0027] (2): Three-dimensions data and the explanatory view 2 of an image are explanatory views of a three dimensional object model and an image, and are the explanation whose drawing 2 (b) drawing 2 (a) looked at explanation of the relation between a three dimensional object model and an image, and looked at Field F from the transverse plane.

[0028] In drawing 2 (a), it is image drawing which was projected on the field F where the 3D-CAD models A and B intersect perpendicularly with the include angle from View VP. Thus, the thing near View VP will be displayed, an image may hide thoroughly depending on the case where they are no projection fields of each model (the field of Model A and the field of Model B change with those times), and its field of it may be lost (the field of Model C is hidden thoroughly).

[0029] In drawing 2 (b), the image display in the case of carrying out a Web output with the three-dimensions assembly model (Model A, the model (B) in this case) seen from the include angle (view VP) of arbitration is shown. However, when displaying this by VRML, loading of the VRML file of Model A and Model B must be carried out, and this requires time amount for mass data processing.

[0030] Then, the image data of whenever [ fixed angle / which was prepared beforehand ] and VRML according to each are prepared, and by display assignment of the first Web, it can see, if an image is displayed and VRML of the components (model A etc.) specified according to the individual next is displayed, and the upper processing time can be distributed. It enables it to output the data linked to VRML of applicable components to the image indicative data.

[0031] (3): The explanatory view 3 of the relation of the 3-dimensional CAD and WWW browser which output the data for Web is an explanatory view of the relation of 3-dimensional CAD and a WWW browser. In drawing 3, 3-dimensional CAD (3D-CAD) 1 is displayed on the 3D-CAD screen of dedication of the 3D-CAD data stored in the storing means 3. Moreover, 3-dimensional CAD 1 is outputted to the storing means 4 by using as Web data (data for the Internet) an image indicative data and the data linked to VRML of applicable components. A user outputs this Web data to the browser screen 6 through WWW browser 5, and can see the 3D-CAD model from arbitration.

[0032] (4): The explanatory view 4 of the 3-dimensional CAD which outputs the data for Web is an explanatory view of the 3-dimensional CAD which outputs the data for Web. In drawing 4, left-hand side [ dotted line ] shows the interior of 3-dimensional CAD, and right-hand side shows the exterior. A control section 11, 3D reading control section 12, the VRML output-control section 13, the image output-control section 14, the link

merge application 15, the HTML creation control section 16, the assembly information reading section 17, the components information reading section 18, the VRML output section 19, the image output section 20, the information output section 21 corresponding to an article for every dot, the link table reading processing section 22, the HTML output section 23, and the response table 24 of each dot and an article are formed in the interior of 3-dimensional CAD.

[0033] Each storing means of the assembly information 25 which is 3D-CAD information, the part-shape information 26 which is 3D-CAD information, VRML27 for every each part article, the image 28 for every scene, and the HTML29 grade for every scene is formed in the exterior of 3-dimensional CAD.

[0034] (Explanation of operation) It is actuation of 3-dimensional CAD (1) - (8) It follows and explains.

(1) a control section 11 -- 3D reading control section 12 -- going -- the assembly information reading section 17 and the components information reading section 18 -- 3D-CAD information (data) it is -- the assembly information 25 and the part-shape information 26 are read.

[0035] (2) A control section 11 is the above (1). Directions are taken out to the VRML output section 19 so that the VRML output of the VRML information for every each part article may be automatically carried out in the VRML output-control section 13 based on the acquired information, and VRML27 for every each part article is outputted.

[0036] This is the 3-dimensional each configuration file found with 3D viewer in Web.

(3) Moreover, the above (2) In addition to an output, by the control section 11, directions are passed so that image information may be created in the image output-control section 14.

[0037] (4) Create the image 28 for every scene in the image output-control section 14 as a general format (bmp, tiff, gif, jpeg ...) normalized from the image output section 20 in the image information at which it looked from each.

[0038] This is a still picture file for every scene seen with the image viewer of Web.

(5) At the image output-control section 14, it is the above (4). It records what article is displayed for every dot location on each image on "the response table 24 of each dot and an article" via the information output section 21 corresponding to an article for every dot at the same time it outputs image information.

[0039] This information is similar to the data of drawing 5 mentioned later.

(6) Above (5) Simplification to drawing 6 later mentioned by the link merge application 15 based on the outputted "response table 24 of each dot and an article" - drawing 10 is performed, and "the response table 24 of each dot and an article" is updated.

[0040] (7) At a control section 11, it is the above (6). Control is passed to the HTML creation control section 16 when it completes.

(8) The HTML creation control section 16 reads the content of "the response table 24 of each dot and an article" in the link table reading processing section 22, changes it into a support data character string, and output it to "HTML29 for every scene" via the HTML output section 23.

[0041] This is the HTML file of Web.

(5): The explanatory view 5 of the example of VRML support setting out of explanation a each display dot of VRML support setting out of a display dot is an explanatory view of VRML support setting out of each display dot, drawing 5 (a) is an image description of drawing, and drawing 5 (b) is explanation of the example of data.

[0042] The image of the rectangular components A and B is shown in drawing 5 (a). For example, Components B are shown by each dot (64 72) which is each point, (65, 72), (66, 72), (67, 72), (64, 73), (65, 73), (66, 73), and (67, 73).

[0043] In drawing 5 (b), it is data which stuck the link on VRML of the components corresponding to each display dot (each point) of every [ of the rectangular components A and B (image) ]. This is automatically created by the HTML creation control section 16 of 3-dimensional CAD. For example, in the example of data of a drawing upper case, if a dot (64 72) is clicked, it will direct to carry out loading of the VRML of Components B.

[0044] b) The explanatory view 6 of the example which summarized each dot and reduced link place data is an explanatory view of VRML support setting out in which each display dot was summarized, drawing 5 (a) is an image description of drawing, and drawing 6 (b) is explanation of the example of data.

[0045] The image of the rectangular components A and B is shown in drawing 6 (a). This is the same as drawing 5 (a). In drawing 6 (b), by the method explained by drawing 5, it must specify for every display dot and link data become huge. Then, a link place is summarized when an adjacent link place is the same. For example, in the example of data of a drawing upper case, if the inside of a field is clicked with the rectangle (rect) surrounded by the dot (64 72) and the dot (67 73), it is directing to carry out loading of the VRML of Components B.

[0046] c) explanation of how in a polygon to collect -- in a actual example, it does not become a rectangle like the example of drawing 6. For this reason, it will divide into a polygon and a link place will be summarized.

[0047] Drawing 7 is an explanatory view (the 1) of a way in a polygon to pack, drawing 7 (a) is an image description of drawing, and drawing 7 (b) is explanation of the polygonal example of division (1). Drawing 8 is an explanatory view (the 2) of a way in a polygon to pack, drawing 8 (a) is explanation of the polygonal example of division (2), and drawing 8 (b) is explanation of the polygonal example of division (3). Drawing 9 is an explanatory view (the 3) of a way in a polygon to pack, drawing 9 (a) is an image description of drawing, and drawing 9 (b) is explanation of the polygonal example of division (4).

[0048] In drawing 7 (a), it is the image of the polygonal components A and B, and Components B are shown by the slash and Components A are shown by the grid.

- In the explanatory view 7 in the case of dividing each part article A and B into a polygon, and summarizing a link place (b), each part article A and B is divided into a polygon for an image data, and the link place is summarized. For example, with Components B, since Components A are in inside, it has divided into four polygons.

[0049] - Create link data so that data may be further lessened in the explanatory view 8 in the case of considering the link place currently used most as a representation link (a) in the field in every several dots, and it may become a representation link about the link place currently most used not in each dot but in the field in every several dots. For example, the dot of the small (2 dots) components A surrounded by the components B of drawing 7 (b) reduces link data as components B (Components A are deleted) like drawing 8 (a).

[0050] - By collecting in fields, such as a rectangle and a circle, in the explanatory view 8 in the case of making link format simple (b), all image datas are approximated with a rectangle, it can simplify and link data can be reduced. In addition, it is also possible to be also able to collect not with a rectangle but with a circle, and to collect using a rectangle and a circle.

[0051] - In the explanatory view 9 in the case of making it link to the components currently most used within the break and the matrix by the grid-like matrix with the number of dots specified beforehand (a), the image of the polygonal components A and B is the same as drawing 7 (a), and being divided by the matrix of the shape of a grid of a 9-dot number is shown.

[0052] In drawing 9 (b), link data are created so that it may be made to link to components with the field currently most used within a break and this matrix by the matrix of the shape of a grid of a 9-dot number in the image data of drawing 9 (a). Thereby, in Components A, two pieces and Components B serve as a break of ten matrices.

[0053] (6): The explanatory view 10 of a 3D-CAD screen is an explanatory view of a 3D-CAD screen. In drawing 10, the example of menu placement into 3-dimensional CAD is shown in the 3D-CAD screen. Each part article is displayed on left-hand side, and the directions section of an input, an output, CAD, the exterior, IGES (foreign file), and DXF (foreign file) and WWW is prepared in right-hand side.

[0054] (7): The explanatory view 11 of the example of a link is an explanatory view of the example of a link. In drawing 11, the image is shown in the upper left. The rectangle frames A, B, C, D, E, and F are formed in this image. By clicking these rectangle frames A, B, C, D, and E and the interior of F, loading of the VRML of corresponding components is carried out, and a VRML screen is displayed.

[0055] For example, if the inside of the rectangle frame A is clicked, the VRML screen (A) shown by the arrow head will be displayed. If the inside of the rectangle frame B is clicked, the VRML screen (B) shown by the arrow head will be displayed. In addition, a click of outside the limit [ of the rectangle frames A, B, C, D, E, and F ] will display the whole VRML screen (H).

[0056] In addition, although the link to Components VRML explained from the image on account of explanation with the gestalt of said operation, with a large-scale real product, from a product assembly condition, it is further decomposed with the child unit, and a unit and after passing through some tree structures, components are reached in many cases. For this reason, it is desirable to make it link to a unit image from product image information actually, and to link to VRML of components from a terminal-unit image.

[0057] Moreover, if the image information in each stage creates automatically the image information seen from some directions and display selection is enabled at the time of retrieval, it is more practical.

[0058] As mentioned above, in the three-dimensions configuration retrieval system using the Internet, since the amount of data transfer decreases, it becomes possible to make improvement in the speed and the network load of a response mitigate.

[0059] (8): Explanation three-dimensions configuration information creation means 13a of install of a program, Image creation means 14a, link-information creation means 16a, 3D reading control section 12, the VRML output-control section 13, the image output-control section 14, the link merge application 15, the HTML creation control section 16, the assembly information reading section 17, the components information reading section 18, the VRML output section 19, the image output section 20, the information output section 21 corresponding to an article for every dot, The link table reading processing section 22 and HTML output section 23 grade can be constituted from a program, and the main control section (CPU) performs them, and they are stored in the primary storage. These programs are processed with data processors (computer), such as a common personal computer, a common workstation, etc. This computer consists of hardware, such as an input unit which are input means, such as file equipments, such as the main control section, a primary storage, and a hard disk, an indicating equipment, and a keyboard.

[0060] The program of this invention is installed in this computer. This install stores these programs in the record (storage) medium of portable molds, such as a floppy and a magneto-optic disk, and is installed in the file equipment formed in the computer through networks, such as LAN, through the drive equipment for accessing to the record medium with which the computer is equipped. And a program step required for processing is read from this file equipment to a primary storage, and the main control section performs.

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the principle explanatory view of this invention.

[Drawing 2] It is the explanatory view of a three dimensional object model and an image in the gestalt of operation.

[Drawing 3] It is the explanatory view of the relation of the 3-dimensional CAD and WWW browser in the gestalt of operation.

[Drawing 4] It is the explanatory view of the 3-dimensional CAD which outputs the data for Web in the gestalt of operation.

[Drawing 5] It is the explanatory view of VRML support setting out of each display dot in the gestalt of operation.

[Drawing 6] It is the explanatory view of VRML support setting out in which each display dot in the gestalt of operation was summarized.

[Drawing 7] It is the explanatory view (the 1) of a way in the polygon in the gestalt of operation to pack.

[Drawing 8] It is the explanatory view (the 2) of a way in the polygon in the gestalt of operation to pack.

[Drawing 9] It is the explanatory view (the 3) of a way in the polygon in the gestalt of operation to pack.

[Drawing 10] It is the explanatory view of the 3D-CAD screen in the gestalt of operation.

[Drawing 11] It is the explanatory view of the example of the link in the gestalt of operation.

[Description of Notations]

4a Storing means

11 Control Section

13a Three-dimensions configuration information creation means

14a Image creation means

16a Link-information creation means

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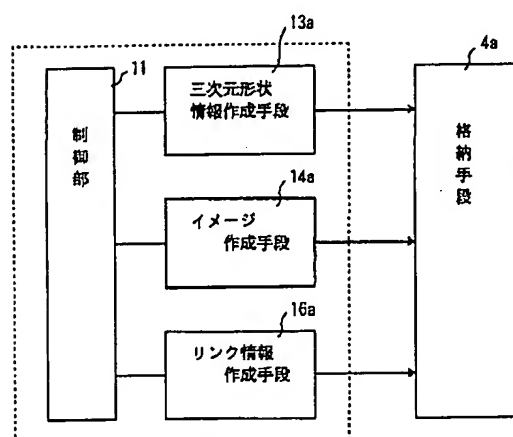
---

DRAWINGS

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[Drawing 1]

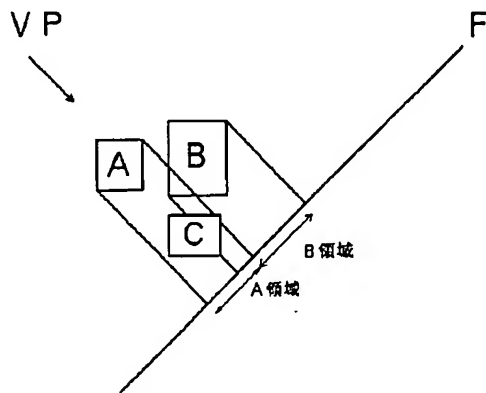
本発明の原理説明図



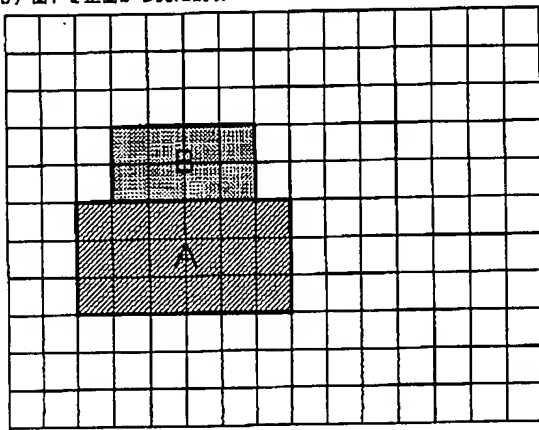
[Drawing 2]

# 三次元モデルとイメージの説明図

(a) 三次元モデルとイメージの関係の説明

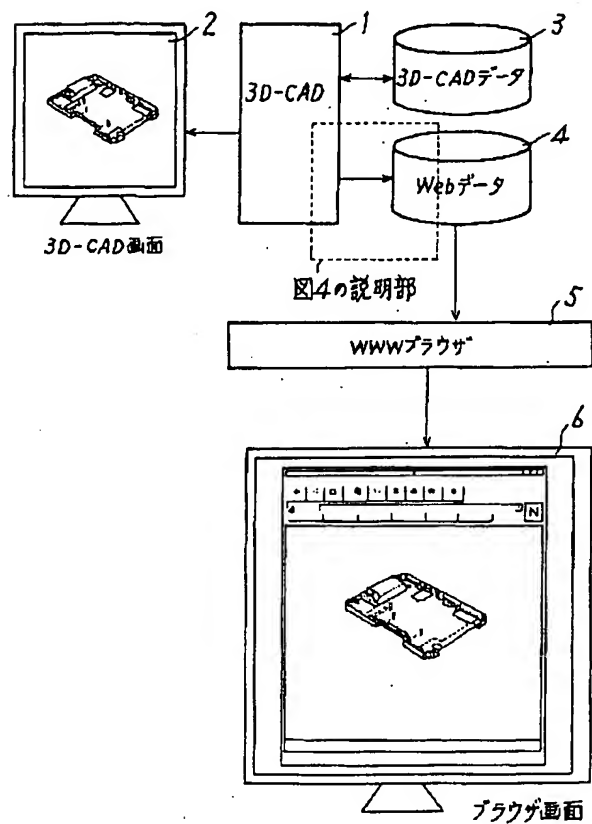


(b) 面Fを正面から見た説明



[Drawing 3]

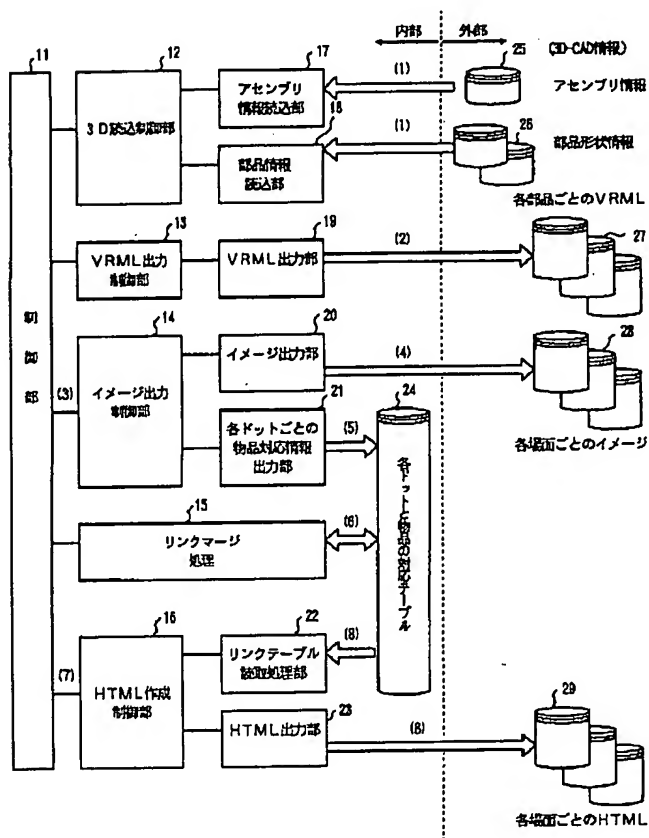
## 三次元CADとWWWブラウザとの関連の説明図



[Drawing 4]

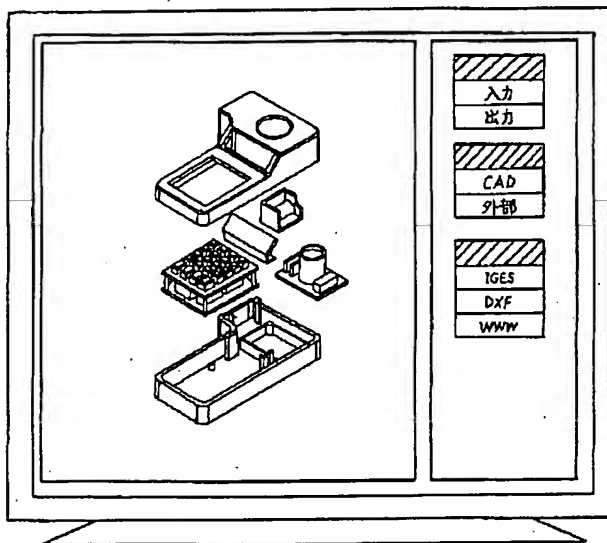


## Web用データを出力する三次元CADの説明図



[Drawing 10]

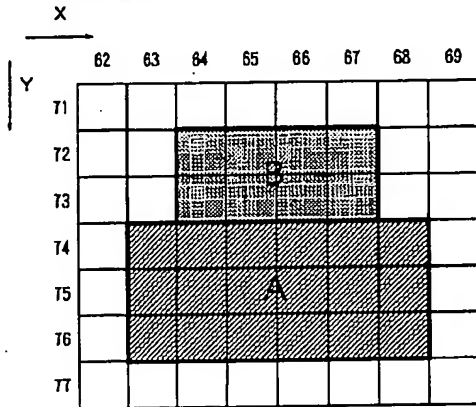
## 3D-CAD画面の説明図



[Drawing 5]

# 各表示ドットのVRMLアンカ設定 の説明図

(a) イメージ図の説明



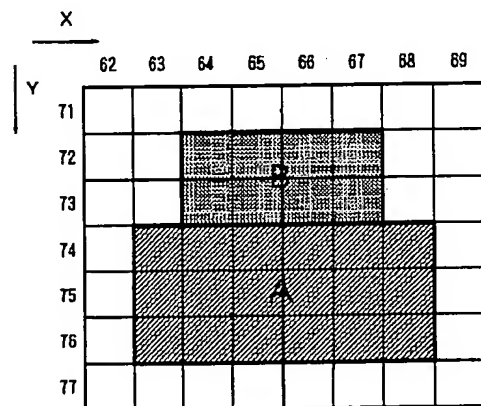
(b) データ例の説明

```
<AREA SHAPE="rect" COORDS="64,72,64,72" <embed SRC=B.wrl alt=VRML MENU>
<AREA SHAPE="rect" COORDS="65,72,65,72" <embed SRC=B.wrl alt=VRML MENU>
<AREA SHAPE="rect" COORDS="66,72,66,72" <embed SRC=B.wrl alt=VRML MENU>
<AREA SHAPE="rect" COORDS="67,72,67,72" <embed SRC=B.wrl alt=VRML MENU>
<AREA SHAPE="rect" COORDS="64,73,64,73" <embed SRC=B.wrl alt=VRML MENU>
...
<AREA SHAPE="rect" COORDS="63,74,63,74" <embed SRC=A.wrl alt=VRML MENU>
<AREA SHAPE="rect" COORDS="64,75,64,75" <embed SRC=A.wrl alt=VRML MENU>
...
<AREA SHAPE="rect" COORDS="68,76,68,76" <embed SRC=A.wrl alt=VRML MENU>
```

[Drawing 6]

## 各表示ドットをまとめた VRMLアンカ設定の説明図

(a) イメージ図の説明



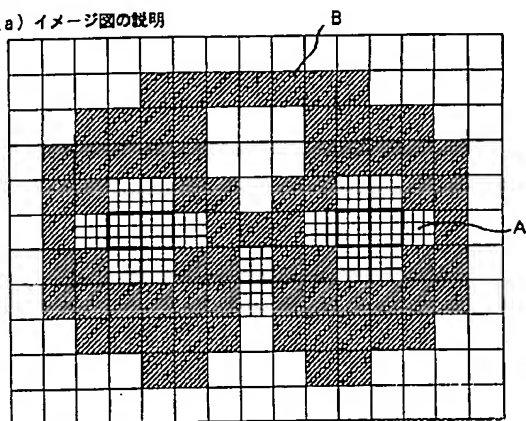
(b) データ例の説明

```
<AREA SHAPE="rect" COORDS="64,72,67,73" <embed SRC=B.wrl alt=VRML MENU>
<AREA SHAPE="rect" COORDS="63,74,68,76" <embed SRC=A.wrl alt=VRML MENU>
```

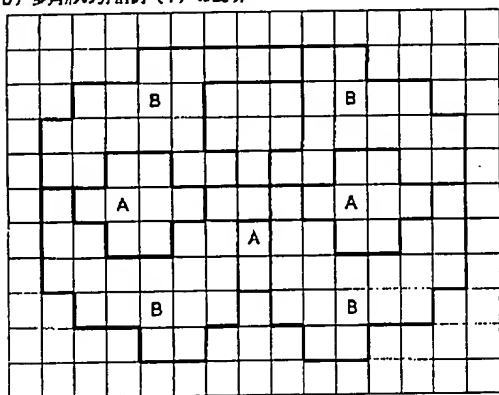
[Drawing 7]

## 多角形でのまとめかたの説明図（その1）

(a) イメージ図の説明

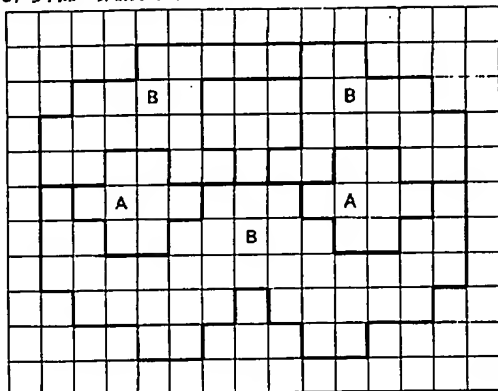


(b) 多角形の分割例 (1) の説明

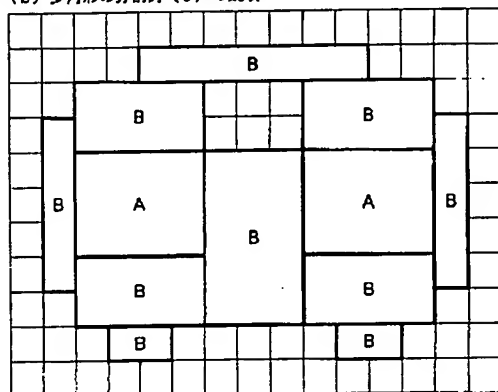
[Drawing 8]

## 多角形でのまとめかたの説明図（その２）

(a) 多角形の分割例（２）の説明

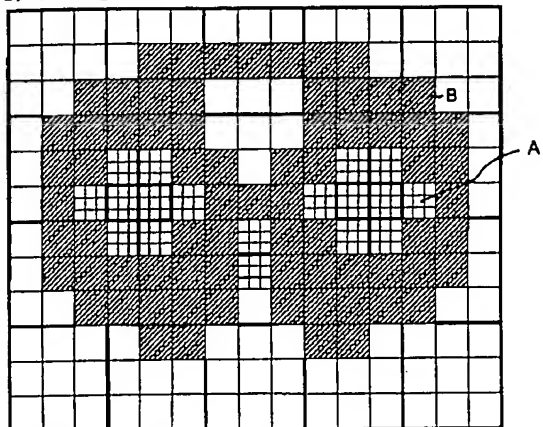


(b) 多角形の分割例（３）の説明

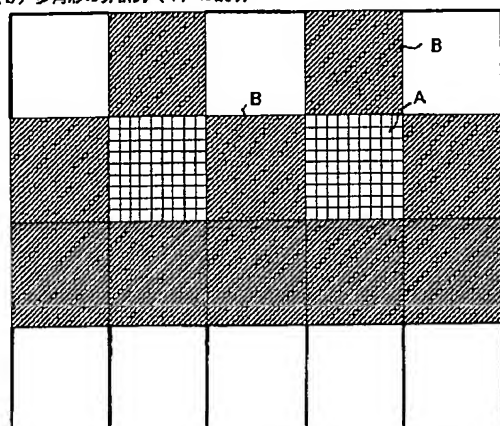
[Drawing 9]

## 多角形でのまとめかたの説明図（その3）

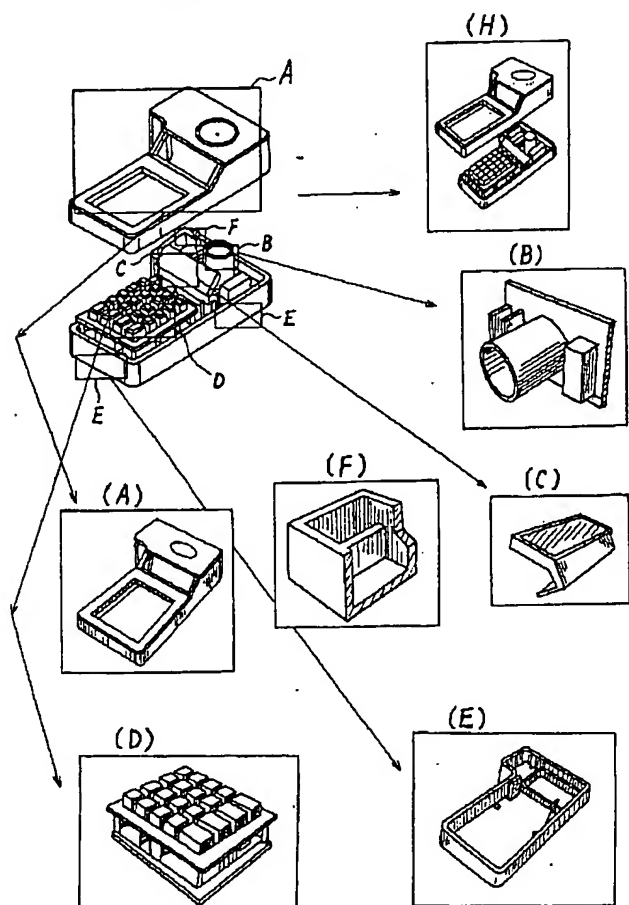
(a) イメージ図の説明



(b) 多角形の分割例(4)の説明

[Drawing 11]

## リンクの具体例の説明図



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[Translation done.]

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